PROJECT INFORMATION MEMORANDUM (PIM)
FOR
APPOINTMENT OF CONCESSIONAIRE ON DESIGN BUILD FINANCE OPERATE AND TRANSFER (DBFOT) WITH 100% CONCESSIONAIRE INVESTMENT ON PPP MODEL FOR THE WORK OF COLLECTION, PRIMARY & SECONDARY TRANSPORTATION OF C&D WASTE TO THE PROCESSING PLANT INCLUDING ESTABLISHMENT OF PROCESSING PLANT AND PROCESSING OF 750 TPD C&D WASTE FOR A CONCESSION PERIOD OF 15 YEARS

PACKAGE 3

Prepared by

CLIENT

BENGALURU SOLID WASTE MANAGEMENT LIMITED

RITES LTD

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The BSWML Company is formed as per companies act, 2013 is responsible for carrying out business within the jurisdiction of Bangalore Urban District including BBMP for managing various types of waste including Construction and Demolition waste.

In this regard, a comprehensive management plan to handle the Construction and Demolition waste has been prepared and planned to be taken up under PPP model.

DISCLAIMER

A comprehensive Project Information Memorandum (PIM) has been prepared to provide an overview of the existing facilities and the status of C&D Waste Management and handling processes. The information contained herein is condensed for the corresponding package.

It is important to note that the PIM is intended to offer a general understanding of the current situation, and the assessment of such facilities shall be an integral part of the Bidder's or Applicant's responsibility. RITES, as the consultant and author of this document, and BSWML & BBMP, do not assume any liability for deviations from the information provided in this write-up. This document is meant to serve as a reference and initial guide for interested parties, and it is recommended that Bidders or Applicants conduct their due diligence comprehensive assessments to ensure accurate and up-to-date information before participating in any related projects or initiatives.

While every effort has been made to ensure the accuracy and reliability of the information presented, neither RITES nor BSWML shall be held responsible for any discrepancies, omissions, or changes that may arise after the publication of this document. Any reliance on the contents of this PIM is done so at the sole discretion and risk of the reader or user. This disclaimer underscores the importance of independent verification and assessment when considering participation in projects related to Solid Waste Management and any other associated activities.

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GLOSSARY

ABBREVIATIONS	FULL FORM
BBMP	Bruhat Bengaluru Mahanagara Palike
BUA	Bangalore Urban Agglomeration
BUD	Bengaluru Urban District
BSWML	Bengaluru Solid Waste Management Limited
CAPEX	Capital Expenditure
C&T	Collection & Transportation
COD	Commercial Operational Date
CPCB	Central Pollution Control Board
C&D	Construction and Demolition
CPHEEO	Central Public Health and Environmental Engineering Organization
CSR	Corporate Social Responsibility
DPR	Detailed Project Report
DBFOT	Design Built Finance Operate and Transfer
GPS	Global positioning system
GHG	Green House Gases
GoK	Government of Karnataka
GoI	Government of India
GVW	Gross Vehicle Weight
IEC	Information, Education, and Communication
IT	Income Tax
KCDC	Karnataka Compost Development Corporation
KSERC	Karnataka State Electricity Regulatory Commission

MoHUA	Ministry of Housing and Urban Affairs
NGO	Non-Governmental Organizations
O&M	Operation & Maintenance
OPEX	Operational Expenditure
PPP	Public Private Partnership
PMC	Project Management Consultancy
SPCB	State Pollution Control Board
SCT	Secondary Collection and Transportation
TPD	Tonnes per Day
ULB	Urban Local Bodies
UDD	Urban Development Department
UN	United Nations
WMD	Waste Management Department
YoY	Year on Year

1. INTRODUCTION:

1.0 PROJECT INFORMATION

The BSWML acting through and represented by Government of Karnataka and are engaged taking up the scope of services to attain the Garbage Free City (GFC) of Bengaluru by implementing various policies as per the MOU of BSWML. In this connection, BSWML is intend to establish a dedicated mechanism to handle the removal of C&D waste through a scientific Mechanism. To this effect, M/s BSWML appointed M/s RITES Ltd a PSU under Ministry of Railways to prepare inception/Feasibility/ Detailed Project reports to appoint the agency for the Collection and Transportation of the Construction and Demolition (C&D) Waste from various parts of the Bengaluru city. In this context, BSWML advised M/s RITES to take up two independent studies to prepare the detailed projects reports to provide the scientific solution to remove the C&D waste from source of its generation and to eliminate the black spots and to establish the processing plants to process the C&D waste at different parts of the out skirts of the Bengaluru city.

1.1 Scenario-1: Collection, primary transportation and secondary transportation of the C&D waste of about 1750 TPD to the existing processing plants located at Kannuru with processing capacity of 750 TPD and Chikkajala with processing capacity of 1000 TPD.

1.2 Scenario-2: Comprehensive proposal for collection, primary transportation & secondary transportation and processing the same at 4 locations by identifying the land parcels to establish the 4 processing facilities of about 750 TPD at each location.

1.3 Basis for assessment of the C&D Waste:

BSWML supplied the study report prepared by Senior Environmental Officer of KSPCB and has been taken as the basis to assess the quantities generated in Bengaluru city which has been made in more meaningful with four zones of the city and bifurcated the C&D waste in the zones

1.3.1 As per the report the quantity statement is as follows:

(1) North & Northeast zone: 2541.00 TPD
(2) East and Southeast Zone: 2675.00 TPD

(3) West and Southwest Zone: 802.5. TPD
(4) West and Northwest Zone: 696.00 TPD.

1.3.2 It has been ascertained from the operators of the existing plants and noted that there are existing C&D waste processing plants located as one at Kannur with 750 TPD processing capacity established by Private entity and run by collecting the tipping from BBMP to process the C&D waste and Chikkajala with 1000 TPD Capacity established by BBMP and operated by private vendor and there is one more processing plant at Anekal established and operating by private a builder. Though the plants are established to process the C&D waste with designated capacities, and there is huge quantum of C&D waste being generated but the same is not transported to these existing two plants. The plants at Kannur & Chikkajala are located at North and eastern part of the city. The assessed quantity of C&D waste being generated in this part of the city is about 2500 TPD but the minimum required quantity 1750 TPD is getting to the processing plants has become a big challenge to ULB as there is no scientific Collection & Transportation of C&D waste mechanism is established.

1.4 Existing transport mechanism:

The trucks being deployed by private agencies are not meeting any regulations and nor are they carrying to any defined disposal sites or neither disposing at existing plants.

1.4.1 Pollution due to existing transportation

The other major setback in continuing to operate with the existing Transport mechanism which results in huge pollution as listed below

1. Pollution caused by Trucks.
2. The disturbed flow of traffic due to truck movement.
3. Un organized transportation
4. Un organized collection

1.4.2 Pollution Load Caused by a 10 Ton Single axle Truck Transporting C&D Waste: The average mileage of a 10 Ton capacity truck: 4 Kmpl (on actual grounds It shall be about 2 to 3 KMPL which is much less than standards) Average distance to be travelled by truck to transport 10 Tons of C & D waste: 60km Fuel required: 15 litres. Carbon dioxide Produced by Burning 15 Liters of Diesel: 15 x 2.62 kg =39.3 kg

1.4.3 IISc Bengaluru conducted a study on pollution due to transport vehicles deployed by private owners to carry the C&D waste and it has been observed that 390 Truckloads of C&D wastes are dumped daily in the dump sites and the majority are dumped in low-lying areas and crates created by stone quarrying. At a rate of 10 Tones per Truck, to transport 1000 TPD, 100 Trips are needed, and this may result in the emission of 4 Tons of Carbon Emissions per day.

1.4.4 Pollution Caused by a 10 Ton Single axle Truck while Transporting C&D Waste as follows:

Average truckloads/day in Bangalore city	390 (as per IISc Report)
Carbon Dioxide produced /truck/ load	40 kg approx/h
Carbon dioxide produced by 390 truckloads	15.6 Tons of Carbon dioxide / day
	i.e., 5694 Tons / year

1.4.5 By considering above and to maintain pollution and dust free city, it is essential to establish a dedicated collection, transportation in scientific mechanism and reduce the CO2 emission

2. JURISDICTION OF PROPOSED PROJECT

2.1 PROJECT AREA INFORMATION:

a) Karnataka State Pollution Control Board (KSPCB) conducted a detailed study and assessed the generation of C&D waste base of the field survey held during 01.01.2020 to 28.06.2021.
b) The study was conducted on each ward under each zone.
c) The nature of the project and detailed out based on the layout development and individual construction
d) The average C&D waste generation for the new construction as per the CPCB norms It shall be 40 to 60 KGs per Sqm of BUA which is average of 50 Kg/Sqm.
e) The nodal officer under his guidance a dedicated team has been established to assess the C&D waste and the calculations based on the team.
f) The summary of the C&D waste generation based of KSPCB assessment

2.2 Overview of the C&D WASTE GENERATION

1. North & Northeast zone: 2541.00 TPD
2. East and Southeast Zone: 2675.00 TPD
3. West and Southwest Zone: 802.5. TPD
4. West and Northwest Zone: 696.00 TPD.

2.3 Action plan proposed

By considering the above assessment, it has been concluded that about 6700 TPD of C&D waste is being generated daily on an average but it is not being processed and also not scientifically transported. Hence BSWML has taken up the proposal to establish the comprehensive proposals for Collection & Transportation and Processing of the C&D waste by appointing the Concessionaire to be appointed on Design Build Finance Operate and Transfer (DBFOT) with the 100% investment by the concessionaire towards capital investment and also for the Operating and Maintenance of the infrastructure for C&T and P&D of about 4750 TPD under 7 (seven) slices/ Packages. The revenue to meet the capital investment as well as O&M cost shall be paid by Authority/ client/

BSWML to the concessionaire on tipping fee per Ton as per the terms and conditions and scope of work mentioned in RFP and DCA of the corresponding packages.

2.4 Overview of the Project

From the total available assessed quantity of 6700 TPD, presently about 4750 TPD has been taken up in phase and accordingly the approvals from the competent client has been obtained to handle the quantity of about 4750 TPD. From the 4750 TPD of C&D waste, the subject package size is of 750 TPD is proposed to collect the C&D waste and stored in 5.00 Cum capacity containers/bins at the source generation points from the corresponding jurisdiction of the proposed Package and transport the same through primary transportation with 7.50 T GVW vehicles or equivalent capacity hook loader from the collection points and then transport to the transfer stations and transfer the same from the small containers of about 5.00 Cum containers to the large size containers of about 20.00 Cum containers at the transfer stations. The large size containers are filled up to the maximum capacity, then the same large containers are proposed to be lifted by hook loaders of 28.0 T GVW capacity which shall carry these 20.00 Cum containers to the corresponding processing plant. Under the Package 3 of 750 TPD processing plant will process the C&D waste and the remaining inerts will be sent to the disposal site. The collection of the C&D waste is identified and a jurisdiction map is attached at Annexure -1 to the PIM report.

3. THE SALIENT FEATURES OF THE C&D WASTE MANAGEMENT

Description of the Package 3	Unit	Quantity
"Design Build Finance Operate and Transfer (DBFOT) with 100% Concessionaire Investment on PPP Model for the works of Collection, Primary Transportation & Secondary Transportation of C&D Waste to the Processing plant including establishment of Processing Plant and Processing of 750 TPD C&D Waste as per Scope of work of in the PIM document, RFP document and the T&C in Concession Agreement, C&D Waste Management Rules 2016; SBM-2.0, CPHEEO Manual and any other amendments to such rules and guidelines during the concession period of 15 years of O&M which is after the COD.	**Tons per day (TPD)**	**750**

3.1 Aims & objectives of the project:

The Collection of C&D waste is stored in 5.00 cum containers by deploying mechanical equipment's/ manual lifting as is case from source generation spots, then Primary transportation using 7.5 T GVW Hook loaders to the designated Transfer stations of each package. Further, the waste collected in 5.0 cum containers is transferred into large size 20.00 Cum containers at transfer stations and Secondary Transportation from the transfer stations using 28.00 T GVW hook loaders by carrying these 20.00 Cum containers to the C&D Waste processing facilities and processing facitlites to be established by the concessionaire at their own cost for the capacity of 750 TPD processing center.

a. Waste management techniques to collect and transport to the processing facility in ways that are Environmentally, Financially and Socially Sustainable.
b. Based on Waste hierarchy (Reduction > Reuse > Recycling >Recovery >Disposal).
c. Collaboration of all stakeholders.
d. BS-vi vehicles proposed to deploy to reduce the air pollution
e. IEC activities
f. Mobile Tracking Management through RFID /GPS mechanism to monitor the weight and trip and distance through advanced software's connecting to the ICCC with call Center to citizens to connect the mechanism.

4. SCOPE OF WORK:

The scope of work is divided into following sections and sub sections

4.1 Section-1: Collection & Transportation:

4.1.1 Sub-Section-1: Collection: The concessionaire shall procure the optimum required number of containers of 5.00 Cum capacity along with suitable hook loaders to carry these containers. Deploy the minimum required labour at each C&D Waste collection spot to fill the containers. The filled containers need to be taken by hook loader within stipulated time mentioned in RFP and DCA. The minimum required containers to be deployed based on the assessment of the available quantity at source.

4.1.2 Sub-Section-2: Primary Transportation: The filled containers from C&D waste generation points shall be carried by the optimum capacity of the hook loaders to be deployed and carry the filled containers to the transfer stations. The small size containers shall be transferred the waste into the larger size of 20.00 Cum or more capacity containers at the transfer stations.

4.1.3 Sub Section-3: Secondary Transportation: The secondary transportation through the hook loader of 28.00 T GVW or more capacity to be deployed to carry the filled larger size containers from the transfer station to processing plant.

4.2 Section-2: Administrative activities:

4.2.1 Sub Section-1: GPS/RFID/Mobile tracking mechanism: The concessionaire has to establish the comprehensive RFID/ GPS mechanism to containers, hook loaders and weigh bridges along with CCTV and connect the entire vehicle tracking mechanism and loading assessment mechanism to the central control command system of BSWML and monitor the same

4.2.2 Sub Section-2: Information, Education and Communication (IEC) activities: Deploy the minimum required expert teams and promote the activities through social media to establish the IEC system and create the awareness programs among the citizens and make them to be part of the SBM-2.0 as per the guidelines. Establish the call centre to attend the public redressal and complaint resolving mechanism as per the guidelines of SWM 2016 rules or any rules prevailing to attend the complaints as per the DCA clauses

4.2.3 Sub section-3: Infrastructure & facilities: Establish the Vehicle washing system, Workshops to maintain the vehicles, fuel stations, public utilities for the staff and workers deploy the minimum required staff for each activity and maintain the proper records of the deployment of the vehicles, manpower etc.

Section-3: Processing and Disposal:

Sub- section-1: Establishment of the civil infrastructure: The concessionaire is required to prepare a comprehensive layout plan to establish the treatment plant as per the details mentioned in DCA & RFP and process the 90 % of the waste received at processing plant on day to day basis and avoid the accumulation of the waste at receiving yard. The processing materials need to be properly stacked and deployed by the marketing team to assess the requirement of such materials demand in the market.

Sub-section-2: Disposal of inert: After processing upto to 10% of total waste will be sent to disposal site.

It has to be noted that the Ministry of Environment, Forest & Climate Change has published notification on 29.07.2024 for Construction & Demolition Rules, 2024 which shall be into effect from 1st April, 2025. Till then Construction & Demolition Rules, 2016 shall be effective.

4.3 The detailed scope of work is as follows

4.3.1 It shall be proposed that a comprehensive plan shall be prepared in consultation with agency who is going to be appointed the BSWML should prepare comprehensive C&D Waste Management Plan, covering storage, collection and transportation to the proposed designated processing plants and further process and disposes with 750 TPD at various location of each package.

4.3.2 It has to be noted that the Ministry of Environment, Forest & Climate Change has published notification on 29.07.2024 for Construction & Demolition Rules, 2024 which shall be into effect from 1st April, 2025. Till then Construction & Demolition Rules, 2016 shall be effective.

4.3.3 The Comprehensive Plan shall indicate for the collection, storage,

containment, transportation of all claimed & unclaimed C&D waste to the facility for its further processing and disposal.

4.3.4 The concessionaire will be responsible for lifting unclaimed waste from areas, as directed by BSWML officials, which otherwise cause nuisance to vehicular traffic, mainly on both sides of the roads and at junction points. The heaps of C&D waste dumped by road side/isolated, is to be cleared by the concessionaire. The unauthorized dumping needs to stop within the stipulated time mentioned in DCA and its articles.

4.3.5 Set a common call centre facility in consultation with the Concessionaire selected for other slice and GPS based, Android& iOS based interactive Mobile Application for easy access of C&D waste facility for the user (8 am to 8 pm during 365 days) for registering a request for collection from BSWML and private parties. Concessionaire should attend all the sites within 48 hours. The mechanism for surveillance of C&D waste in order to avoid the duplication of waste collected & disposal should be implemented by the concessionaire. The same will be integrated with BSWML control command centre.

4.3.6 The responsibility of the concessionaire includes providing adequate numbers and types of vehicles of make Tata / Ashok Leyland / Eicher / Hyva or any other equivalent for collection and transportation. These vehicles shall be in compliance with RTO rules/ regulations and all other applicable rules & regulations/ notifications by competent Authority.

4.3.7 Install GPS in all vehicles at its own cost and provide MIS data to BSWML on a monthly basis and whenever required by BSWML intermittently.

4.3.8 Provide all the MIS Data of the project to BSWML along with a monthly bill as approved by BSWML at the time of execution of project.

4.3.9 For less than 1 MT of C&D Waste generator i.e Small Generator who has not registered with BSWML and their payment is not reflected in ESCROW account, in such case the Concessionaire has to provide service with small size containers after registering the requirement of the removal of such waste for less than 1 MT C&D Waste after confirmation of payment receipt paid to BSWML.

4.3.10 For generators of C&D waste equal or more than 1 MT & less than 20 MT i.e, Medium Generators, who have not registered and their payment is not reflected in ESCROW Account, then such cases need to be brought to the notice through online tracking mechanism and Concessionaire shall

provide the containers to source generation spots after register their request and after confirmation of the payment in ESCROW account.

4.3.11 For BSWML's other civil works / bulk generators having quantity equal or more than 20 MT per day or 300 MT per project per month there will be two cases as mentioned below. The C&D waste supplied by bulk waste generators are required to take the processed materials to their upcoming projects at the rates applicable as per the local SR rates.

a. The concessionaire has to enter into an MOU with the Bulk waste generators in consultation with authority to handle the bulk waste. The signed copy between the parties need to be submitted to authority.
b. In case the bulk generator uses BSWML's Collection and Transportation services then the Concessionaire for this project will make arrangements for Collection, Transportation, and in case of Processing & Disposal (if applicable) of C&D waste from bulk generators. Bulk generator will make payment to the concessionaire directly per the rates approved by BSWML.
c. In case the bulk generator transports the waste directly to the processing plants site on his own cost then the Bulk generator shall seek prior approvals for the accepted transport mechanism being accepted by BSWML and bulk generator has to pay the fee towards the processing fee to the processing plant agency as per the rates approved by BSWML. The amendment to the existing rules if any to this extent shall be made and informed to concessionaire and BWGs.
d. In case of other than the BWGs, if there is a difference between quantity registered and payment made in ESCROW account and actual C&D Waste found on the site, then Concessionaire shall inform BSWML, in cases the subsequent confirmation for additional quantity based on the online GPS tracking mechanism then the concessionaire shall collect the C&D. However the actual quantities shall be ascertained through online GPS tracking mechanisms and the cross verification shall be carried out through the independent agency appointed by BSWML.

4.3.12 For unclaimed debris in any ward, the concessionaire in the presence of BSWML's staff will take minimum Two (2) Geo-Tagged photographs

of the C&D Waste Pile from different angles, which will mention its date, time and location before and after collecting the waste. Two (2) Geo-Tagged photographs each, before and after collecting the C&D Waste, shall be uploaded on the mobile application/ system and shall be submitted along with the monthly bill. Payment of unclaimed debris shall be made by BSWML as per the record. Concessionaire have to install suitable weight calculation mechanism through an online tracking system on all the vehicles and containers deployed for the project. Specific weight at every spot of claimed and unclaimed C & D Waste shall be recorded, and the concessionaire shall make the needful arrangement.

4.3.13 Facility for "on-demand/ on-call pickup" of C&D from claimed C&D waste generators needs to be created by the concessionaire.

4.3.14 The Concessionaire has to market and promote its services for lifting of claimed C&D waste.

4.3.15 Give methodology of collection & transportation C & D waste which should include collection from zone, ward, complain based collection, request based collection system utilising the vehicles as mentioned.

4.3.16 Proper transportation permits should be obtained and the agency shall have the necessary permits.

4.3.17 The Bidder has to dispose of the inerts at the suitable location and appropriate manner as per the methodology and rules of the receiving area and with approvals from competent authority.

4.3.18 The bidder has to provide Uniforms, Fluorescent Jacket and other Safety Gear as per C&D Waste Management Rules 2016 to its operating staff.

4.3.19 The Bidder has to provide an adequate number of Supervisory staff with conveyance for mobility and communication tools for effective co-ordination of the system.

4.3.20 The Bidder has to specifically procure the assets for the C&D waste purpose and all the assets would be painted with specific colour code and number and name written on it as per direction from BSWML officials. After the compliance only the vehicles would be allowed to operate.

4.3.21 The operation involves various movements of vehicles for maintenance, transportation of vehicles from collection point to Plant site, processing of the C&D Waste and produce recycled materials, movement of vehicles from plant site to disposal site.

4.3.22 The successful bidder has to provide registration number of their vehicles

to BSWML prior to start of the operation. BSWML may direct the Concessionaire to get audited any of the software/ GPS system/ VTMS system used for the project from the authorized agencies acceptable to BSWML at any time during the contract period.

4.3.23 The successful bidder has to establish a control room, workshop on the processing plant site itself.

4.3.24 The concessionaire shall undertake a mass awareness program, in their respective slice, so as to ensure that C&D waste being generated in its contract area is not being littered along the road side or disposed-off at existing MSW dump site(s).

4.3.25 The concessionaire shall carry out awareness, capacity building and ICE activities.

4.3.26 The concessionaire shall create a sustained system of information, education and communication for construction and demolition waste through collaborations with expert institutions and civil societies and also disseminate through their own website.

4.3.27 The concessionaire should keep a track of the generation of construction and demolition waste within the BSWML limits and establish a database and update on a regular basis in-order to optimize its processing facility.

4.3.28 The concessionaire shall coordinate with the BSWML periodically to understand the C & D waste generation.

4.3.29 The concessionaire will involve community participation and discuss with the citizen community in order to ensure a free flow of information on waste generated by individuals so as to optimize the collection, transportation, Processing and Management Facility.

4.3.30 The successful bidder shall compulsorily install Vehicle Tracking Management System (VTMS) on each vehicle used for collection & transportation of C&D waste and disposal of post processing rejects, with the necessary web based software, accessible from web, personal computer/ laptops, network links, antivirus, printer, GPS / Sim Card / Dongle and shall provide necessary training to the Municipal Staff and connect the system with Municipal server through IT department of BSWML with loading / unloading switch for vehicles transporting C&D waste/ post-processing rejects at their own cost. Please note that for payment of tipping fee, VTMS record is mandatory.

4.3.31 The successful bidder to provide Vehicle Tracking Management System (VTMS) including complete client site connectivity at different locations,

Weighbridge etc. The system must be a web-based application including GPS based live tracking with GIS mapping and integrated map. The successful bidder must provide all necessary hardware (e.g. Computers, GPS etc.) and necessary connectivity with BSWML server. The successful bidder to comply with server requirements of BSWML.

4.3.32 The successful bidder shall have to provide a separate set of vehicles with VTMS installed and connected to BSWML Server for this project.

4.3.33 GPS System shall be installed / fixed / provided in each vehicle deployed under this project for collection & transportation of C&D waste and shall be in working conditions always. Feed from these GPS will be integrated with BSWML websites.

4.3.34 The successful bidder shall provide the real time feed / monitoring of GPS System through Web based Technology and integrated to BSWML portal.

4.3.35 The successful bidder shall collect, transport & dispose the waste generated as per the proposal, if it is less or more than indicated in contract then in such case the concessionaire shall be dealt to account the same as per the accepted rate per ton and the concessionaire is bond to follow the same as per the instruction of authority.

4.3.36 Before commencement of services under this project, the concessionaire shall submit detail work plan for collection, transportation, processing & disposal of C & D waste and get it approved from BSWML. This plan may be amended in future as per the project requirement; however such amendment will require prior approval of BSWML.

4.3.37 Collection of municipal Solid Waste and Bio-medical Waste is not within the purview of this Project and it is supposed to be handled as per SWM Rules 2016 and Biomedical Waste – Management & Handling Rules. The Successful Bidder is therefore under no obligation to collect, transport, treat, or dispose of Municipal Solid Waste and Bio-medical waste. However, in the event of finding Municipal Solid Waste and or Bio-medical waste disposed off unscientifically alongside C&D Waste or mixed with C&D Waste, in the wards covered in Complete Sanitation or Partial Sanitation, the Concessionaire shall notify the same to BSWML. The Concessionaire shall not take such waste to the C&D Waste Processing Facility as it may contaminate other products derived from the Waste.

5.0 Service level benchmarking:

5.1 The Concessionaire shall achieve Collection, Transportation from Commercial Operation Date in the following manner.

Sl. No	Period	Benchmark
1.	By Six Months from Commercial operation Date	75%
2.	By Twelve Months from commercial and operations date	100%

Table 1: Service Level Benchmarking

5.2 The operational hours of collection & Transportation in two tasks

a. Task-1 Primary Transportation

5.00AM to 9.00AM
7.00PM to 11.00PM
} 7.5 T GVW (for primary collection & transportation)

b. Task-2: Secondary Transportation

5.00AM to 9.00AM
10.00PM to 2.00AM
} 28 T GVW (secondary transportation)

5.3 Transportation Mechanism:

1. Collection of C&D waste from source by deploying the containers of 5.0 Cum capacity
2. Primary transportation with 7.5T GVW or equivalent capacity with hook load mechanism.
3. Secondary collection with 20.0 Cum containers
4. Secondary transportation: with 28.0 T GVW vehicles with hook loading mechanism.

5. All transport infrastructure must have minimum of additional 10 % of the total required quantities towards break down and O&M requirements
6. The concessionaire shall be required to procure 100% of the required collection bins/ Containers to meet the collection of the C&D waste and transport vehicles with hook loading system can be assessed based on the requirements such as number of trips a hook loader can make in ideal condition for the primary and secondary transportation and accordingly the manpower and infrastructure may be ascertained.

6.0 Machinery & Manpower:

6.1 Depending on the requirement, the successful bidder shall deploy adequate resources in each ward and ensure that 100% C&D waste is collected as required under this project and no C&D waste is left unattended & lying on roadside or any other open space.

6.2 Mechanized lifting & collection of C&D waste shall be done to the extent possible so that there shall be minimum physical handling of C&D waste (ideally zero). For mechanized lifting auto tippers/hook lifts/dumper placers or suitable mechanism can be used.

6.3 Minimum capacity of Hook Loaders/Tippers/Trucks shall be of 7.50 T GVW for primary collection and 28.00 T GVW shall be for secondary transportation

7.0 Print media:

The entire concept of proper handling and disposal of C&D waste, including information about the designated C&D waste collection points and the uses of recycled C&D waste materials, toll free helpline number for on-demand lifting of C&D waste should be conveyed through posters, brochures, pamphlets given to each house or commercial establishment and can be displayed in prominent positions as well as local newspapers in consultation with BSWML.

8.0 Electronic media:

Local cable television channels, radio, websites shall be used by Concessionaire to inform citizens about the toll-free helpline numbers facilitating on-demand C&D waste collection, new C&D waste collection arrangements and advertise contact numbers of officials to call for problem

solving or for reporting grievances relating to unauthorized dumping and non-removal of C&D waste.

9.0 **Internal Performance Monitoring**:

The Concessionaire shall propose Internal Performance Monitoring mechanism for effectiveness in project implementation covering all areas of service delivery including efficient redressal of complaints, and monitoring the performance of workforce etc.

10.0 **Contract Period**:

The contract period shall be 15 years from the commercial operation date (COD). The following phases for the execution of the project are as follows-

10.1 Phase I – Mobilization Period**:** 1 month from the date of receipt of letter of acceptance or from the date of handing over of the facilities, whichever is later. Mobilization period includes time to **start the process to** obtain all the necessary clearances & approvals from relevant authorities and **place orders to** deploy vehicle and manpower for collection & transportation mechanism. If the delay is beyond the control of the concessionaire, then the mobilization period shall be extended based on the reasons recorded and in such recorded hindrances justified by the engineers in charge or the authorised representative of BSWML.

10.2 Phase II –Construction Period- Eighteen Months for the establishment of the processing facilities, civil infrastructure etc in case the processing facilities are to be established or otherwise 12 months to complete the procurement process of the vehicle.

10.2.1 Collection & Transportation vehicles through procurement/ hiring/ owned within 12 months from the date of LOA and same should be in staggered manner. At least 50% of the total vehicles shall be required to be deployed within 6 months from the date of LOA and balance 50 % within 12 months from the date of LOA. In case of delay due to unforeseen circumstances, the period may be extended with prior approval of Authority.

11.0 Permits & Clearances:

11.1 Permits and **clearance** shall be obtained as per Applicable Law which includes but not limited to C&D Waste Management Rules 2016, The Environment Protection Act 1986, The Air (Prevention and Control) Pollution Act 1981 and Water (Prevention and Control) Pollution Act1974 as amended

from time to time and If any statement requirements specified by MOEF, CC, MOHUA, NITIAAYOG, CPCB and KSPCB.

11.2 The projects relating to C&D Waste may require a number of clearances including but not limited to the following:

1. Prior Environmental Clearance.
2. Clearance from Airport Authority of India (if the Landfill Facility is within 20 Kms from the airport).
3. Clearance from Development Authority.
4. Traffic Police clearance for vehicular movement in the city. Or
5. If any statement requirements specified by MOEF&CC, MOHUA, NITIAAYOG, CPCB and KSPCB.

11.3 The Concessionaire shall be solely responsible for taking various statutory and non- statutory clearances for the Project from all concerned authorities. The Authority may assist the Concessionaire in procuring the clearances required for the Project.

11.4 This being a green initiative, may be entitled to Carbon Credits. The Concessionaire may be required to apply for availing the carbon credits, and can avail the same. If credits are generated, they will be shared in 70% (Concessionaire) to 30% (BSWML)

12.0 The Concessionaire shall have the liberty to upscale the technology during the Contract Period with the prior approval of the Authority and clearance from the State Pollution Control Board for deriving larger benefits without causing any harm to the neighbourhood, health and environment of the City and without putting any additional burden on the Authority.

13.0 The Concessionaire shall have to follow all the directions contained in the C&D Waste Rules as well as State Laws and Rules or any other applicable rules/ regulations/ guidelines as amended from time to time. In the event of any major change in the legal framework in the Country or the State, necessitating a major change in the C&D Waste management Facility towards collection transportation need to be adhered to and follow such change in rules and policies.

14.0 Facility duly created by the Concessionaire following the present law and the Rules, he shall, on being asked by the Authority, comply with the new laws and the Rules at his cost and may ask for reasonable compensation which shall be determined by a technical committee that may be appointed by Government/ Authority.

15.0 The Concessionaire shall use vehicles; equipment and machinery which meet the standard emission norms prescribed by the manufacturer/ the competent authority from time to time and adhered to the rules and regulation set by the statutory bodies towards Operation and maintenance of infrastructure and equipments.

16.0 **Operation and maintenance of infrastructure and equipment:**

The successful Bidder shall be responsible for construction, operation and maintenance of tipper trucks, mechanical lifting arrangement to transfer the waste from bin into tipper truck, required infrastructure including treatment units [crushers and separators] etc. parking facilities, weighbridge, hook loaders.

17.0 **Treatment Process:**

17.1.1 The successful Concessionaire shall set up a C&D waste management facility at designated site along with required site development work(s) such as but not limited to construction of site office, boundary wall/appropriate fencing, drainage work, electricity [inside and outside the processing unit] etc. The successful Concessionaire shall be expected to use a combination of technologies that includes crushing, screening, and separation etc. that will maximize waste treatment and would ensure no more than 10% of input waste is sent for disposal. The Concessionaire shall use "Wet Process technology" for processing of C&D waste to minimize nuisance due to excessive dust generated during processing activity. The rejects shall be disposed-off by the concessionaire at his own cost in suitable land and for which no separate payment shall be made. However, the average distance of 5.0Km has been considered in the scope of the concessionaire. If the average distance is more than 5.0Kms in one direction, then the rate per KM lead shall be paid for the additional lead based on the additional distance established by a designated committee after the landfill area has been approved by the

authority. The Selected Bidder shall be required to assess the quality and quantity of the C&D waste generated for arriving at the technology selection. The total system should be compliant with the applicable rules and guidelines, framed in India, for the purpose. The successful concessionaire shall bear the total cost towards setting up the facility including design built, vehicles for collection & transportation of C & D waste from the places in jurisdiction of each package to the processing plant site, processing & disposal of C & D waste and operation & maintenance cost, charges towards all statutory requirements etc.

17.1.2 Manufacturer should meet the following requirements:

a. The concessionaire has to adhere to the manufacturing of the processing unit as per the specifications to meet the process minimum 150 TPH processing capacity of the machinery. The plant should be based on wet processing
b. The manufacturer shall have to attach Authorization Certificate along with technical support from the manufacturer or from his authorized dealer.
c. The technical specifications and literature of plant equipment & machinery offered must accompany the offer.
d. Proposed plant should be based on wet processing suppressing dust and noise pollution and contain basic units, but not limited to crusher, log-washer, hydro-cyclone, filters/ separator etc.
e. Similar Manufacturer means the Manufacturer of processing unit should have successfully installed & commissioned minimum 2 such units which should be in satisfactorily operation for 1 year, in last 5 years
f. The Concessionaire will be expected to use a combination of (mechanical processes) technologies / systems that includes crushing, screening, and separation etc.
g. Successful concessionaire should try to achieve zero discharge of rejects/ effluents from the proposed plant however a maximum of 10% discharge of rejects/effluents will be permitted.
h. The entire C&D Waste processing and management system should be compliant with C&D Waste Management Rules 2016 (C&D Rules) or the applicable rules of the C&D waste processing.

i. The Concessionaire shall use "Wet Process technology" must be used for processing of C&D waste to minimize nuisance due to excessive dust generated during processing activity (Provide technical specifications of the equipment).

j. Work on the Processing plant site should be carried out in shifts. However actual working hours are to be decided as per the applicable laws and directions/ consent given by CPCB/KSPCB for operations of the plant.

17.1.3 The Concessionaire shall clearly state the technology he will use for Processing of Waste and give a brief synopsis of the technology and its operation and maintenance. The technology offered shall be proven and in use within or outside the Country under similar situations and the Concessionaire shall obtain necessary clearance from the State and/or Central Pollution Control Board as required at his own cost and efforts.

17.1.4 The Concessionaire shall have the liberty to upscale the technology during the Contract Period with the prior approval of the Authority and clearance from the State Pollution Control Board for deriving larger benefits without causing any harm to the neighborhood, health and environment of the City and without putting any additional burden on the Authority.

17.1.5 The Concessionaire shall have to follow all the directions contained in the C&D Waste Rules as well as State Laws and Rules or any other applicable rules/ regulations/ guidelines as amended from time to time. In the event of any major change in the legal framework in the Country or the State, necessitating a major change in the C&D Waste Processing Facility and Landfill.

17.1.6 Facility duly created by the Concessionaire following the present law and the Rules, he shall, on being asked by the Authority, comply with the new laws and the Rules at his cost and may ask for reasonable compensation which shall be determined by a

technical committee that may be appointed by Government/ Authority.

17.1.7 The Concessionaire shall use vehicles; equipment and machinery which meet the standard emission norms prescribed by the competent authority from time to time.

17.1.8 Revenue generated from processed C&D waste (components) shall be minimum as per the below derived percentage as per Circular Economy;

S. No	Description of the item	Percentage
1	Aggregate	24%
2	Sand	10%
3	Murrum/Soil	60%

(NOTE: Buy Back of finished products – The Authority does not bind itself to buy back the finished products. The concessionaire himself will sell the finished products etc. However an MOU shall be entered by Concessionaire with the Bulk Waste Generators (BWG) before start of collecting from BWGs or if BWGs directly transporting to the processing plant to buy back agreement towards the finished products as per the extent of rules prevailing)

17.1.9 Right to Sell Recycled Products: The Authority will authorize the successful concessionaire to sell the C&D waste recycled material and its value-added products in open market to any Government Department or private parties or open market to any entity. The Maximum Retail Price (MRP) of various recycled products should not be more than the rates of similar items mentioned in Karnataka Schedule of Rates (SR) + prevailing cost index at any particular time or market rates. However, the successful concessionaire will be at liberty to sell their products at a lower rate than the MRPs to maximize utilization of these products. However, the concessionaire is required to meet the quality standards of its products as per the applicable rules / standards.

The work at the site can be divided into the following broad categories:

1. **Site development**
2. **Constructing and operating of C&D waste processing system**;
3. **Operation and maintenance of infrastructure and equipment**

The Site development:

The Scope of work to be carried out by the successful Applicant under site development is as mentioned below but not limited to clearing old structures, levelling the site and any other activity related to land development, construction of site office, boundary wall / appropriate fencing, drainage, electricity (inside and outside the processing unit) etc.

Construct and Operation of C&D Waste Processing System:

Responsibilities of Operator should be detailed to include the following: Undertaking necessary geotechnical survey to assess the hydrological and flooding potential of the site Construction of C&D Waste Processing Plant.

In addition to this, infrastructure such as office building, internal roads, fencing wall/ internal boundaries to restrict the entry to specific areas of site to the authorized persons only.

The Concessionaire shall also be responsible for setting up a laboratory for testing of recycled products from C&D waste.

Providing furniture and fixtures, lighting arrangement inside the C&D Waste processing facility as well as outside, in the premises.

Providing drainage systems and cables, wiring with necessary electrical fixtures as necessary.
BSWML may facilitate all forms of support to the Concessionaire for obtaining certification/ statutory clearances required for accessing water, electricity and telephone connection.

Operation and maintenance of infrastructure and equipment:

The successful Bidder shall be responsible for construction, operation and maintenance of tipper trucks, mechanical lifting arrangement to transfer the

waste from bin into tipper truck, required infrastructure including treatment units [crushers and separators] etc. parking facilities, weighbridge, hook loaders.

The C&D Waste Processing Facility by the Concessionaire must earmark separate space for storage of C&D Waste residues or aggregates obtained after processing for one month generation and while recycled products shall be stored for two/three – month generation.

18.0 Dust Control Plan: Suitable measures as mentioned in various rulings of the Hon'ble Supreme Court of India and Hon'ble NGT for controlling the dust-based pollution shall be taken by the Concessionaire to control and manage the dust generated during processing of C&D Waste and ensure that dust generation is minimal even during the dry seasons. Concessionaire will ensure all dust control measures in designated collection points also. Further, the agency will ensure all dust control norms in designated collection points and plant as per C&D Waste Management Rules 2016 or the applicable rules of the land use. Concessionaire shall also follow the latest dust control norms as applicable till the concession period. Adequate number of anti-smog guns shall be provided by the concessionaire. A Digital display to monitor the pollution / dust will also be provided by Concessionaire.

17.1 Effective implementation of C&D waste collection & storage at source by all waste generators, and at all levels and scales shall be established & transportation of the same shall be provided.

17.2 Open dumping of C&D waste is prevented with strict rules.

17.3 The concessionaire must ensure the health, safety and dignity of every person and stakeholder involved in handling C&D waste in all respects.

5. PROJECT COST:

S.No	Name of the package	Capital cost in Crores	O&M Cost of the project for 15 years amount in Crores
1	Package-3: APPOINTMENT OF CONCESSIONAIRE ON DESIGN BUILD FINANCE OPERATE AND TRANSFER (DBFOT) WITH 100% CONCESSIONAIRE INVESTMENT ON PPP MODEL FOR THE WORK OF COLLECTION, PRIMARY & SECONDARY TRANSPORTATION OF C&D WASTE TO THE PROCESSING PLANT INCLUDING ESTABLISHMENT OF PROCESSING PLANT AND PROCESSING OF 750 TPD C&D WASTE FOR A CONCESSION PERIOD OF 15 YEARS	53.25	447.45

Table 2 Project Cost

ASSUMPTIONS CONSIDERED TO CALCULATE THE REVENUE FROM PROCESSING OF C&D WASTE

S. No.	Description of the item	Unit	Quantity
1	Sand (as per KPWD SR) (1 T is 0.582 m3)	M cum	41.031
2	Aggregate (as per KPWD SR) (1 T is 0.38 m3)	M cum	64.30

Table 3 Assumption Calculation

6. ASSESSMENT OF VEHICLES:

Collection, Transportation and processing of the C&D waste from the source generation spots by deploying 7500 KG GVW hook loaders with 5.00 Cum Carrying Capacity of containers for the primary transportation. These primary transportation hook loaders shall deploy within 5.0 KM radius from the transfer point to the source generation spots.

- The secondary transportation from the transfer point to the processing spot/ dumpsites shall be 25.00 KM onside distance and shall be carried through 28000 KG GVW hook loaders with 20.00 Cum capacity containers.
- The operating hours shall be 4 hours in the morning shift and 4 hours shall be evening shifts. and as per the RTO norms.However the collection bins can be placed at the request of the source generator at the collection points irrespective of the transportation hours and the same filled bins or containers have to be collected as per the receipt of the call from the source generator.

6.1 VEHICLES FOR PRIMARY TRANSPORTATION:

Package	Description of the component	Assessed Quantity
Package 3 (750 TPD): APPOINTMENT OF CONCESSIONAIRE ON DESIGN BUILD FINANCE OPERATE AND TRANSFER (DBFOT) WITH 100% CONCESSIONAIRE INVESTMENT ON PPP MODEL FOR THE WORK OF COLLECTION, PRIMARY & SECONDARY TRANSPORTATION OF C&D WASTE TO THE PROCESSING PLANT INCLUDING ESTABLISHMENT OF PROCESSING PLANT AND PROCESSING OF 750 TPD C&D WASTE FOR A CONCESSION PERIOD OF 15 YEARS	5.00 Cum Container	231
	7.5 T GVW Hook Loader	18

6.2 SECONDARY TRANSPORTATION:

Package	Description of the component	Assessed Quantity
Package 3 (750 TPD) APPOINTMENT OF CONCESSIONAIRE ON DESIGN BUILD FINANCE OPERATE AND TRANSFER (DBFOT) WITH 100% CONCESSIONAIRE INVESTMENT ON PPP MODEL FOR THE WORK OF COLLECTION, PRIMARY & SECONDARY TRANSPORTATION OF C&D WASTE TO THE PROCESSING PLANT INCLUDING ESTABLISHMENT OF PROCESSING PLANT AND PROCESSING OF 750 TPD C&D WASTE FOR A CONCESSION PERIOD OF 15 YEARS	20.00 Cum Container	58
	28 T GVW Hook Loader	16
	Transfer stations	

7. TIPPING FEE:

The tipping fee is established through a comprehensive analysis of several factors, such as operational costs & associated expenses. This fee is designed to ensure that all operational costs and expenses are adequately covered for the following items.

Factors to be taken into consideration for the tipping fee

1. Deployment of the containers of 5.00 Cum capacity each to store the total C&D waste of 750 TPD of package
2. Lifting the waste from the source generation spots by either through manual lift or mechanical lift
3. Primary transportation vehicles with hook load system to carry the 5.00 Capacity containers
4. Supply and establishment of backend software, Mobile app, GPS based vehicle tracking devices and transfer station solutions by supplying computers, UPS backup, long range RFID reader, Weighbridge integration unit, transfer station application, CCTV Cameras and uninterrupted Wi-fi network etc.
5. Vehicle washing sheds and maintenance yard
6. Administrative offices with required facilities
7. Secondary collection containers of minimum 20.00 Cum capacity
8. Secondary transportation vehicles with hook loading mechanism to carry 20.00 Cum or above capacity containers
9. Primary collection trip distance of 5.00 Kms one directions
10. Secondary transportation of 25.0 Kms of Average distance of one direction.

11. The proposed project to call for the capital investment of the 53.25 Crores and O&M amount of 447.45 Crores over a period of 15 years for Collection, Primary transportation, secondary transportation and processing of the same of 750 TPD capacity processing plant each package of 750 TPD shall be borne by the Concessionaire on their own but by meeting the expenses by way of collecting the tipping fee from BSWML through ESCROW account for the other than the bulk waste generators.
12. The tipping accepted by BSWML through this tender shall be directly collected by the concessionaire from the bulk waste generator towards transportation and Processing of the same.

8. SUMMARY OF THE FINANCIAL MODEL:

IRR: 19.83%
EIRR: 26.76%
Pay-back period: 6th year

CONCLUSIONS:

1. Appoint the Concessionaire for a concessionaire period of 15 years on PPP model with 100% Concessionaire investment on capital cost of Rs. 53.25 Crores and O&M cost of Rs. 447.50 crores for 15 years by the bidder
2. The BSWML shall establish the Escrow account and collect the cess from the construction activities through BESCOM based on per sq.km. based on per sqm. Basis of plan section for modification /alteration/ renovation/new construction activities.
3. The processing fee shall be paid by BSWML from ESCROW Account to the Concessionaire. The assessed processing fee is only for reference purposes.
4. The tipping from bulk waste generators shall be collected by concessionaire directly through an MOU before start of the collection, transportation of the waste from bulk waste generators with a prior intimation to BSWML. Government shall issue directions to Bulk waste generators to this effect through a separate gazette.

9. LIST OF ANNEXURES

Annexure 1: Route Map for vehicle movement from Transfer Stations to Processing Plant

Package-3

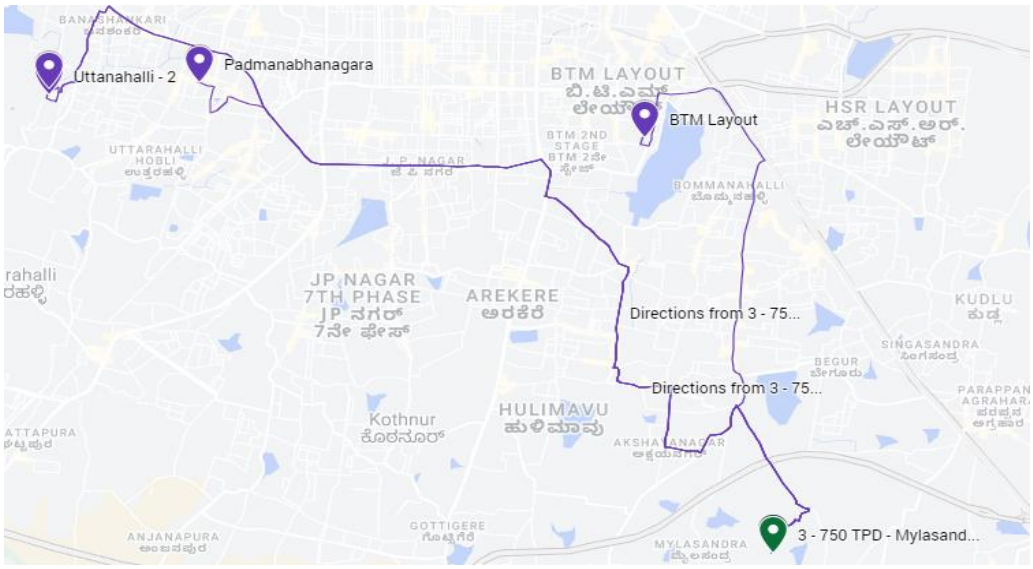
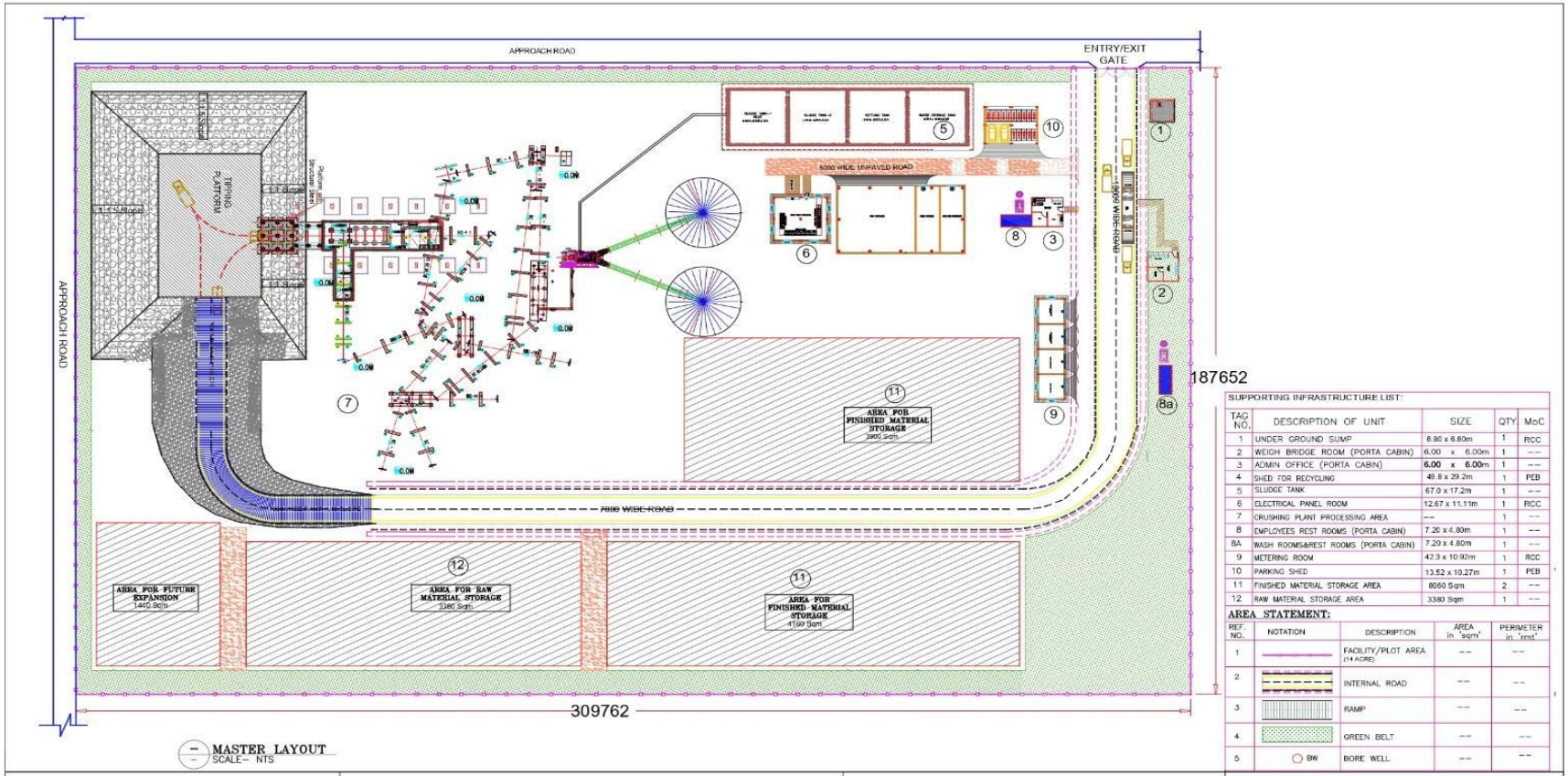


Figure 1 Route Map for Package 3

Proposed locations for transfer stations and distance from Proposed 750 TPD Processing Facility for Package 3							
Transfer Station	**Ward No**	**Zone**	**Ward Names**	**Area in Sq.m**	**Reserve for**	**Distance to processing Facility (Km) (as per Google Route Map)**	**C&D Waste Processing Facility**
1	184	Bommanahalli	Uttanahalli	2630	For Public Use	**19**	Package - 3 - 750 TPD
2	184	Bommanahalli	Uttanahalli	1894	For Public Use	**19**	Package - 3 - 750 TPD
3	173	South	BTM Layout	2003.85	For Public Use	**10**	Package - 3 - 750 TPD
4	182	South	Padmanabhanagara	2442.36	For Public Use	**16**	Package - 3 - 750 TPD
The overall Average distance (in Km) Coverage from all 4 transfer station to Processing Facility is **16 Km**							

Table 4: Proposed Location for 750TPD Processing Facility-Package 3

Annexure– 2: Proposed Layout Plan



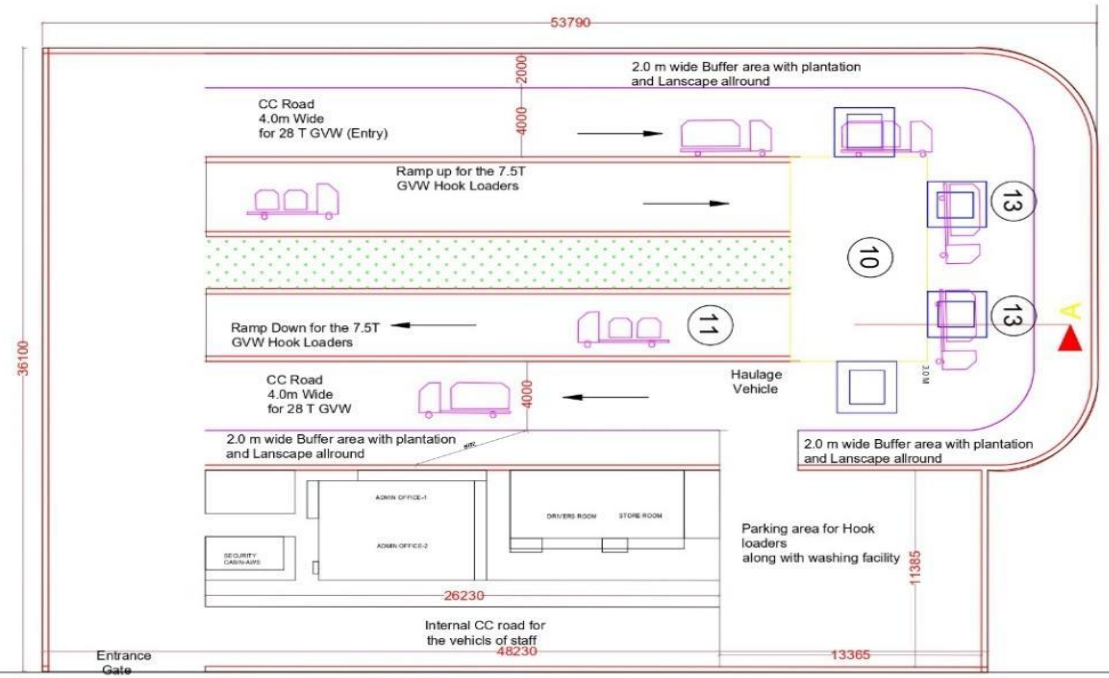
SUPPORTING INFRASTRUCTURE LIST:

TAG NO.	DESCRIPTION OF UNIT	SIZE	QTY	MoC
1	UNDER GROUND SUMP	6.80 x 6.80m	1	RCC
2	WEIGH BRIDGE ROOM (PORTA CABIN)	6.00 x 6.00m	1	--
3	ADMIN OFFICE (PORTA CABIN)	6.00 x 6.00m	1	--
4	SHED FOR RECYCLING	48.8 x 29.2m	1	PEB
5	SLUDGE TANK	67.0 x 17.2m	1	--
6	ELECTRICAL PANEL ROOM	12.67 x 11.11m	1	RCC
7	CRUSHING PLANT PROCESSING AREA	--	1	--
8	EMPLOYEES REST ROOMS (PORTA CABIN)	7.20 x 4.80m	1	--
8A	WASH ROOMS&REST ROOMS (PORTA CABIN)	7.20 x 4.80m	1	--
9	METERING ROOM	42.3 x 10.92m	1	RCC
10	PARKING SHED	13.52 x 10.27m	1	PEB
11	FINISHED MATERIAL STORAGE AREA	8060 Sqm	2	--
12	RAW MATERIAL STORAGE AREA	3380 Sqm	1	--

AREA STATEMENT:

REF. NO.	NOTATION	DESCRIPTION	AREA in 'sqm'	PERIMETER in 'mt'
1		FACILITY/PLOT AREA (14 ACRE)	--	--
2		INTERNAL ROAD	--	--
3		RAMP	--	--
4		GREEN BELT	--	--
5	BW	BORE WELL	--	--

CLIENT:	TOTAL PROJECT MANAGEMENT CONSULTANTS:	JOB TITLE:	DRAWING TITLE:
BENGALURU SOLID WASTE MANAGEMENT LIMITED (BSWML)	M/S.RITES LTD 5th FLOOR INDUSTRY HOUSE, #45 FAIRFIELD LAYOUT RACE COURSE ROAD, BANGALORE-560001	PROPOSED CONSTRUCTION OF 750 TPD C&D PROCESSING PLANT	MASTER LAYOUT PLAN



Details:

S.NO	DESCRIPTION	SIZE
1	GATE-2 NOS	8M
2	COMPOUND WALL	-
3	SECURITY CABIN	3M X 3M
4	WEIGH BRIDGE	6M X 9M
5	WEIGH BRIDGE CABIN	3M X 3M
6	CABIN TOILET	3M X 9M
7	STAFF ROOM	5M X 10M
8	CC PAVEMENT	-
9	GREEN BELT 10M WIDE	-
10	UNLOADING PLATFORM	-
11	RAMP	-
12	ADMINISTRATIVE OFFICE	9M X 10M
13	HOPPERS	-
14	WORK SHOP	10M X 35M

NOTE: ALL DIMENSIONS ARE IN MM

CLIENT	PROJECT	CONSULTANT	DRAWING	SITE AREA
BENGALURU SOLID WASTE MANAGEMENT LTD (BSWML)	PROPOSED TRANSFER STATION FOR THE C&D WASTE AT VARIOUS LOCATIONS	M/S RITES LTD BENGALURU	LAYOUT PLAN	1865.00 SQM

Annexure– 3: C&D Waste Materials Checklist

The following checklist template will be useful when planning to salvage, reuse and recycle demolition materials

Demolition Materials	Comments and Concerns
Air conditioning equipment 1. Computer room packages 2. Mini central systems 3. Window units	CFC
Aluminium: Handrails, other Appliances, white goods	Testing, removal
Asbestos Containing Materials: Insulation, floor and ceiling tile, floor and wall coverings, roofing felt and shingles, wall board, siding, ductwork, adhesives, caulking, putties, taping and speckling compounds.	
Asphalt: Paving Asphalt: Shingles Batteries	
Brass Brick Bronze Cabinets	
Cable: Various Cardboard	
Carpet, padding and backing Cast iron: Radiators, pipes, other Clay tile blocks	
Compressors	
Concrete masonry units Decking: Wood	
Door frames: 1. Wood, metal 2. Heavy vault 3. Thin panel and various Wood, Metal	Non-rated
Ductwork Earth	
Electric switchgear, feeder cables, conduit	
Electrical:	PCB

Cable, Elevator cabs, machinery, shaft equipment, rails Fabric	
Fiberglass	
Fire suppression equipment Fixtures & fittings: Plumbing Fixtures: Electrical	
Flooring: Carpet Flooring, Wood Fuel storage tanks	
Furniture: Wood, Metal Furniture: Reusable Furniture	Can be re-manufactured
Glass: Interior and exterior, Plate, Wired, laminated	
Glazing compound: Asbestos, lead possible Testing Gutters and flashing	Testing
Gypsum blocks Gypsum board	
Hardwood Hazardous materials Heavy timbers	ACBM
Insulation	
Light fixtures: Decorative, Fluorescent and utility fixtures, Vintage fluorescent, incandescent, Lamps: Fluorescent	Mercury retrieval
Lead: Paint, Roofing, Flashing, Piping Light bulbs	Testing, removal
Marble: Toilet partitions, Walls	
Metal: Brass, Bronze, Cable, Cast-iron, Conduit, Copper	PCB Ballasts
Partitions, demountable panels Partitions: aluminium tracks, miscellaneous framing	
Mirrors	
Paper	

Annexure-4: Volume to Weight Conversion

Materials:	Volume *	Weight in Pounds *
MIXED MUNICIPAL SOLID WASTE (MSW)		
MSW, (uncompacted)	One cubic yard	150-300 (225 Average)
MSW, (compacted in truck)	One cubic yard	500-1,000
MSW, compacted in packer truck	3.3 cubic yards	2000 (Average)
C & D; Clean Fill		
Concrete	One cubic yard	860
Asphalt Paving	One cubic yard	773
Brick, Ceramic, Porcelain	One cubic yard	860
Roofing	One cubic yard	731
Wood	One cubic yard	169

Table Volume of Weight Conversion

Annexure-5: Specifications of typical containers to be used for storing C&D WASTE

Items	**M odel**	
Container Specification	Hook Loader	Dumper Placer
Container Type	Closed	Closed
Volume (m3)#	9 & 12-16	1.5*, 2.5-3.5**, 4.5-5***
Material Of Construction	Commercial Mild Steel of Appropriate IS specification (Not less than 3mm for walls/sides and not less than4mm for floor/bottom)	
Recommended Chassis	16-25 T GVW	7*, 9**, 12*** T GVW
Lifting Arrangement	Rear lifting	Rear lifting

#Dimensions of the containers to adhere to the RTO norms. Total loading not to exceed 25 tonnes GVW. The containers shall have an integral securement system to ensure that the rear end of the container is well secured with the vehicle chassis.

Annexure- 6: Illustrative Pictures of Different Containers & Vehicles

Typical Containers

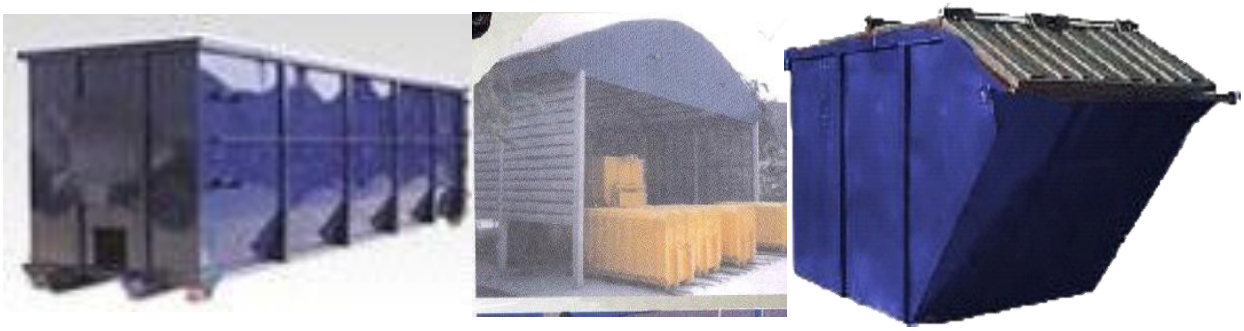


*Figure SEQ Figure * ARABIC 1 Typical Container*

Typical Hook Lifts

*Figure SEQ Figure * ARABIC 2 Typical Hook Lifts*

Typical Dumper Placers

*Figure SEQ Figure * ARABIC 3 Typical Drum Placer*

Annexure- 7: Approximate number of Vehicles to be deployed

Item	Description of the component	Approximate number of Vehicles to be deployed
Vehicles for Primary Transportation	7.5 T GVW or equivalent Hook Loaders/Tippers/Trucks	18

Item	Description of the component	Approximate number of Vehicles to be deployed
Vehicles for Secondary Transportation	28 T GVW or equivalent Hook Loaders/Tippers/Trucks	16